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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/719,950	11/24/2003	Kiomars Anvari		3526

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KIOMARS ANVARI
1567 SERAFIX RD
ALAMO, CA 94507

EXAMINER	
MALEK, LEILA	
ART UNIT	PAPER NUMBER
2611	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/03/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/719,950	ANVARI, KIOMARS	
	Examiner	Art Unit	
	Leila Malek	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11/24/2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 1, 11, and 12 are objected to because of the following informalities:

a. In claims 1 and 11 the acronyms "PCS and LAN" must be spelled out at first occurrence.

b. Claim 1, requires that each comprising step begin with a lower case letter.

c. Claim 1, each step must end with a semicolon ";" instead of a period.

d. Claim 1, line 15, after "base band signals" the period "." Must be deleted or replaced with a comma ","

e. Claim 1, line 13, "the phase rotation lookup table" has antecedent basis problem.

f. Claim 1, line 14, "converts" needs to be replaced by convert.

g. Claim 1, line 20, "prepare" needs to be replaced by prepares.

h. Claim 11 is objected to under 37 CFR 1.75(c) as being in improper form. As to claim 11, Applicant recites "the peak-to-average reduction circuit according to claim 1 and subsequent claims" See MPEP § 608.01(n).

i. Claim 12, line 3, the acronyms "FPGA, ASIC, DSP" must be spelled out at first occurrence.

Appropriate corrections are required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 5-9, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pinckley et al. (hereafter, referred as Pinckley) (US 6,983,026), in view of Montojo et al. (hereafter, referred as Montojo) (US 2003/0202611).

As to claim 1, Pinckley discloses a wireless (see column 1, lines 15-17) peak-to-average reduction circuit (see column 8, lines 52-57) for use with multi-carrier power amplifiers in a wireless communication system to enhance the linearity and performance of the amplifier (see column 1, second paragraph), wherein the peak-to-average reduction circuit comprising: a digital signal processing block to peak-to-average reduce the multi-carrier input signal (see column 8, lines 52-57) using lookup table (See column 13, lines 12-29), a digital signal processing block to use the input and the output of the peak-to-average reduction to produce the phase rotation lookup table (see column 13, first paragraph and column 14, lines 42-62), a digital signal processing block to convert the multi-carrier baseband input signal to individual carrier base band signals (see column 9, lines 37-49 and column 14, lines 48-57), wherein the individual carrier baseband signal is first amplitude limited and then phase rotated (see column 14, lines 48-57) before being up converted to its original multi-carrier baseband signal (column 7, lines 50-60 and column 8, lines 63-66), a digital signal processing block that clips the amplitude of the individual carrier baseband signal by preserving the phase, a multi-carrier transmitter block (See Fig. 2, 211) that prepares the peak-to-average reduced multi-carrier signal for delivery to multi-carrier power amplifier.

Pinckley discloses all the subject matters claimed in claim 1, except having a multi-carrier receiver for the peak-to-average reduction of IF or RF input signal to amplifier. If the input signal is baseband then the multi-carrier receiver is bypassed. Montojo, in the same field of endeavor, discloses an apparatus and method for producing a multi-carrier signal at a reduced peak to average power ratio (see the abstract). Montojo further discloses a multi-carrier receiver for the peak-to-average reduction of IF or RF input signal to amplifier (See paragraph 0019). Montojo does not expressly disclose that if the input signal is baseband then the multi-carrier receiver is bypassed. However, inherently if the received signal is a base band signal (as thought by Pinckley) this step would be useless and will be bypassed. It would have been obvious to one of ordinary skill in the art at the time of invention to use a down-converter in the system to convert the received signal to base-band in order to extract the original signal from the RF signal.

As to claim 2, Pinckley further discloses that the main multi-carrier input signal from the wireless transmitter is sampled using sub-harmonic sampling technique at the input frequency or at an intermediate frequency (see column 7, lines 19-39).

As to claim 3, Pinckley further discloses that the main multi-carrier input signal from the wireless transmitter is sampled using sub-harmonic sampling technique at the input frequency or at an intermediate frequency (see column 7, lines 19-39). Pinckley does not expressly disclose that the digitized main multi-carrier input signal is down converted digitally and decimated to the appropriate number of samples per symbol for further digital signal processing. Montojo further discloses that the main multi-carrier

input signal is down converted digitally (see paragraph 0019) and decimated to the appropriate number of samples per symbol for further digital signal processing (see paragraph 0027). It would have been obvious to one of ordinary skill in the art at the time of invention to use a down-converter in the system to convert the received signal to base-band in order to extract the original signal from the RF signal. Also it would have been obvious to one of ordinary skill in the art at the time of invention to use a decimator in order to generate proper number of samples for further signal processing as suggested by Montojo (see paragraph 0027).

As to claim 5, Pinckley discloses that the multi-carrier input signals from the wireless transmitter are in bit domain and the bit domain baseband signals are up converted (see the abstract), combined (see column 1, paragraph 3) to produce the digital multi-carrier baseband signal. However, Pinckley does not disclose using an interpolator to produce appropriate number of sample per symbol. Montojo further discloses that the main multi-carrier input signal is down converted digitally (see paragraph 0019) and decimated to the appropriate number of samples per symbol for further digital signal processing (see paragraph 0027). It would have been obvious to one of ordinary skill in the art at the time of invention to use a down-converter in the system to convert the received signal to base-band in order to extract the original signal from the RF signal. Also it would have been obvious to one of ordinary skill in the art at the time of invention to use a decimator in order to generate proper number of samples for further signal processing as suggested by Montojo (see paragraph 0027).

As to claim 6, Pinckley discloses that the digital multi-carrier baseband signal is converted to single channel baseband signals (see column 14, lines 48-57). The individual baseband signals are amplitude limited and phase rotated using the phase from phase rotation lookup table (see column 13, lines 25-29), then filtered and up converted back to their original baseband frequency (see column 14, lines 52-55) before all individual baseband signals being combined again to produce the multi-carrier peak-to-average reduced baseband signal (see column 1, lines 40-42).

As to claim 7, Pinckley further discloses that the digital multi-carrier baseband signal is converted to single channel baseband signals (see column 14, lines 48-57), wherein the individual baseband signals are amplitude limited by a clipping circuit that calculates the amplitude and phase of the baseband signal. The amplitude of the base-band signal is clipped or is amplitude limited and then using the phase converted back to complex baseband signal.

As to claim 8, Pinckley discloses that the peak-to-average reduced signal is up converted (see mixers 209 and column 6, lines 49-51) and converted to analog domain at an intermediate frequency or the output frequency (see D/A converters). Pinckley does not disclose that the signals have been up-converted first and then sent to the D/A converters. However, it would have been obvious to one of ordinary skill in the art at the time of invention (it is a design choice) to change the order of up-converters and D/As to meet the system requirements.

As to claim 9, Pinckley further discloses that the peak-to-average reduction phase rotation lookup table (i.e. the phase portion look-up table) is created using the

input and the output from the peak-to-average reduction block during the calibration (see column 5, paragraph 3 and column 13, paragraph 1).

As to claim 12, Pinckley discloses that the DSP function can be implemented in programmable logic, FPGA, Gate Array, ASIC, and DSP processor (see column 4, lines 52-56).

3. Claims 4, 10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pinckley and Montojo, further in view of Peterzell et al. (hereafter, referred as Peterzell) (US 2002/0132597).

As to claim 4, Montojo further discloses that the digital samples of the signals may need to go through a process of decimation or interpolation to have proper number of samples per symbol (see paragraph 0027), however Pinckley and Montojo do not disclose that the multi-carrier input signal from the wireless is sampled using Nyquist sampling technique. Peterzell discloses the use of the Nyquist sampling technique to produce a signal with appropriate number of samples per symbol for the Analog to Digital converter (see paragraph 0087). It would have been obvious to one of ordinary skill in the art at the time of invention to implement the Nyquist sampling technique used to produce a signal with the appropriate samples as disclosed by Peterzell with the peak-to-average reduction circuit disclosed by Pinckley in order to obtain the appropriate sampling rate for producing a multi-carrier signal.

As to claim 10, Pinckley and Montojo disclose all the subject matters claimed in claim 1, except that the received signal strength of the input signal to peak-to-average reduction circuit and transmit signal strength of the output from the peak-to-average

reduction circuit is dynamically measured to adjust the total gain of the peak-to-average reduction circuit zero. Peterzell discloses the use of RSSI measurement as the factor to control the power output of the RF device to a base station (see paragraph 100). It would have been obvious to one of ordinary skill in the art to implement the RSSI measurement method as disclosed by Peterzell in order to calculate the appropriate power or gain to implement for the RF system as disclosed by Pinckley.

As to claim 11, Pinckley does not expressly disclose that the peak-to-average reduction circuit is used in wireless cellular, wireless PCS, wireless LAN, microwave, wireless satellite, none wireless amplifiers, and any wireless communication systems used for military applications. The Peterzell reference however discloses the use of the RF circuit could be implemented in a wireless PCS and Wireless LAN atmosphere (See paragraph 0021). It would have been obvious to one of ordinary skill in the art to implement the RF device being used in a wireless PCS and wireless LAN environment as disclosed by Peterzell with the peak-to-average reduction circuit as disclosed by Pinckley in order to implement the peak-to-average reduction circuit in many different wireless environments.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. (US 2003/0202460, phase rotation look-up table).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leila Malek whose telephone number is 571-272-8731. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Leila Malek
Examiner
Art Unit 2611

L.M

MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER